HEALTH CONDITIONS IN THE MORAVIAN INDIAN MISSION OF SCHÖNBRUNN, IN THE 1770's[1]

AUGUST C. MAHR,
The Ohio State University,
Columbus, Ohio

In May, 1772, on a plateau above, and quite near to, the Tuscarawas River, in eastern Ohio, there was founded the Moravian Indian Mission of Schönbrunn by the well known Missionaries, David Zeisberger and John Heckewelder. They were accompanied and competently advised by the Rev. John Ettwein, a man with an unusual gift of organization. They had moved to the new mission site on the Tuscarawas from Langundo-Utenünk (*Friedensstadt*), a short-lived mission settlement on the Big Beaver, in northwestern Pennsylvania, at the express invitation of the Lenni Lenape king, Netawatwes, who desired to have the wholesome influence and example of a Moravian mission community as near as possible to its capital town of Gekelemukpechünk (Newcomerstown), where to his growing dismay the excessive use of liquor had been increasingly corrupting the physical and moral fibre of men and women alike.

Close to the beginning of the first of the Mission Diaries from Schönbrunn, such as were dispatched at regular intervals to the mother church, at Bethlehem, Pennsylvania, David Zeisberger remarks about a family of ten postulants for admission to the Moravian community that "in externals" they were "very poor, and sickly besides, as the Indians generally are when they come to us, until they have learned to live in a well regulated manner" (1). In part, the physical misery of this particular family may have been caused by the famine widespread, according to ample documentary evidence, among the Indians, in 1772. Zeisberger's remark, however, that the Indians, generally, were impoverished and sickly when they came to the Moravian missions, is obviously based on experience gained *prior* to his coming to Ohio, or he could not have known as yet that their condition improved, once that "they have learned to live in a well regulated manner;" that is, under Moravian mission discipline. After mentioning their lack of physical endurance in "agricultural or other manual labour," John Heckewelder (2) confirms Zeisberger's observation in the following words:

> "Those who have been brought up to regular labour, like ourselves, become robust and strong and enjoy good health. Such was the case with the Christian Indians in the Moravian settlements."

This statement follows a paragraph in which he calls "the Indians . . . in general a strong race of men" capable of carrying record loads for hours and over great distances. The two examples, however, which he cites for it, suggest observations made in mission environment.

From the evidence cited, and from some more here not adduced, it appears that, to a great extent, the Indian population of the Moravian missions was made up of people who sought the missions in a condition of despondency, economical and physical rather than spiritual; yet, there are outstanding cases on record, in which the converts had been in no distress whatsoever, economical or otherwise. Since the rate of recovery, as a result of mission life, apparently was very high,

[1]Paper read before the Anthropology Section of The Ohio Academy of Science at the annual meeting, in April, 1949, at Granville, Ohio. It reports part of the research work done by Dr. Mahr for The Ohio State Archaeological and Historical Society in connection with the restoration of the Moravian Mission town of Schönbrunn. The Society contemplates a detailed publication of these studies when completed.

there is good reason to assert that the Moravian mission atmosphere made for better health conditions than those in the surrounding heathen area. Zeisberger's and Heckewelder's mission diaries and other writings contain the data.

They also show that the locality of Schönbrunn was far from being a health resort; despite the excellent drinking water from the Beautiful Spring; despite its fertile soil; and despite its favorable geographic situation, in general. Whoever knows the Schönbrunn scene understands why it was badly infested with fevers. At the very foot of the Schönbrunn plateau there was the lagoon, a swampy meander loop of the Tusacarawas River. It was the ideal breeding place of a merry assortment of mosquitoes, including the genus Anopheles some species of which are notorious as the transmitters of certain types of malaria. In fact, the mosquitoes hatch, in the lagoon, even today, although the disease itself has disappeared for quite some time from the Tuscarawas and Muskingum valleys. In the 1770's, however, malaria was one of the scourges of both whites and Indians, at Schönbrunn; while Gnadenhütten, likewise founded in 1772 about ten miles downstream from Schönbrunn, but in a less swampy area, had little malaria. With the exception of one entry (Oct. 22, '73), the Gnadenhütten mission diaries, when referring to malaria, tell of repeated incidences, even of epidemic character at Schönbrunn; and so, of course, do the Schönbrunn diaries.

Zeisberger (3) writes about the mosquitoes at Schönbrunn that they "are found in woods in summer time in great numbers;" they "sting, and a night in the forest would be intolerable without the smoke of a fire. They are particularly annoying in changeable weather." Superfluous to say, this was written with no reference to malaria, the dependence of which on transmission by mosquitoes was not discovered until late in the 19th century. Up to that time, it was commonly held that the so-called miasmatic air in certain swampy regions, such as Schönbrunn, caused these fevers whose periodic incidence had long been known but could not be explained.

All malaria attacks recorded in the mission diaries fall within the months of July, August, September, and October. Under September 28, 1772 (4), Zeisberger writes, as follows:

> "Many of our people [that is, Indian converts, *ACM*] have suffered attacks of fever, which is very common here at this time of the year."

1773 was an especially bad fever year. On August 18, 1773 (5), Br. Schmick, the Missionary at Gnadenhütten, makes this entry:

> "[We] left by water for Schönbrunn, where we found Sr. Jungmann in bed suffering from chills and her husband still fagged out and weak from having had the same sickness."

Under August 19, he continues, as follows:

> ". . . we visited the Brethren and Sisters [the converts] there [at Schönbrunn] in their houses and cabins and found many who had chills."

Still referring to Schönbrunn, Schmick writes, under September 21 (6): "Br. John Jungmann had another attack of fever;" and, on September 22:

> "This evening, Br. Jungmann suffered an attack of chills. Bathseba [an Indian convert, *ACM*] prepared at once some *Beson* (usually a concoction made of herbs and/or roots) or medicine for him to drink, which he took gladly."

Br. and Sr. Jungmann, the Missionary couple at Schönbrunn, each had a very bad case of it.[2]) Under September 30, 1775, Zeisberger made this entry in the Schönbrunn Diary (7):

---

[2]According to *SD 5* (July 24, '73), Jungmann must have contracted the fever early in July, 1773. On September 1, he is reported to have "quite recovered from his fever"; a recovery, by the way, which did not last very long. In the same entry, the Diarist remarks that, "since yesterday," August 31, "his wife likewise has been in bed with fever."

> " . . . Br. Jungmann, who has had fever for some time, has become worse and was obliged to take to his bed, . . . "

Zeisberger's entry of October 22, 1775 (8) contains the interesting statement, that

> "Sr. Jungman . . . has for quite some time been suffering of three-day fever."

That clearly marks her case as a tertian malaria (*Plasmodium vivax*) in which the gametocytes erupt from the red corpuscles every 48 hours. Zeisberger adds that she "had severe pains in the side today," indicating that either her spleen or liver, or both, had become affected.

> "After blood-letting," he concludes, "and application of medicinal remedies, she improved during the following days, the fever left her and she was quite restored."

Her husband's case, who, in 1773, is on record of having suffered attacks only one or two days apart (September 19, 21, 22), may have been a case of sub-tertian malaria (*Plasmodium falciparum*) characterized by more frequent, irregularly spaced attacks; or it may have been a case of a double infection, on two successive days, with *Pl. vivax*. Dr. Ernest Carroll Faust[3]) has expressed himself in support of this latter possibility, adding the following remark:

> "Actually we know that under controlled conditions of experimental vivax infection in man there is at times a daily episode of chills and fever, the so-called 'malaria duplicata'."

Finally, there is a remote possibility of Jungmann's case having been a mixed infection: by *Pl. vivax*, causing tertian fever, and *Pl. malariae*, quartan fever; when overlapping, the result may be daily, or irregularly spaced, attacks such as in sub-tertian malaria. Dr. Faust states that *Pl. malariae*

> "may have conceivably been present in the Muskingum Basin at that time, although the distribution of this malaria parasite in the Untied States within the last 50 years or more has been south of the Ohio River."

On the assumption that the mosquito population of the region has not substantially changed since the 1770's, there are two species of *Anopheles* to be considered as probable transmitting agents of malaria at that time: *Anopheles punctipennis* Say, and *A. quadrimaculatus* Say (8a). Dr. Faust gives the following opinion:

> "Although *Anopheles punctipennis* has been found infected in nature, it is much less anthropophilic than *A. quadrimaculatus*. Since the latter species has in recent years been present in Ohio, it is likely that it occurred in the same area in the 1770's. Therefore, it seems probable that the major part of malaria in those days may justly be attributed to the species *quadrimaculatus*."

According to Heckewelder (9), the aboriginal remedies applied in the treatment of "fevers" were, internally, emetics; and, externally, bleeding and sweating. There is ample evidence that the Moravian Missionaries freely and gladly made use of the medical lore of their converts, no less than did the Indians themselves, and with satisfactory results, at that. The Indian method of bleeding, such as practiced on Mrs. Jungmann, is described by Zeisberger (10), probably from personal experience, in the following words:

> "For blood-letting they use flint or glass. Of either they break off little fragments until a piece is secured that suits the purpose. This is fixed to

[3]In a personal letter, of May 17, 1949, I have received invaluable information on this particular problem from Dr. Faust, The William Vincent Professor of Tropical Diseases and Hygiene, and Head of the Division of Parasitology, Department of Tropical Medicine and Public Health, in the School of Medicine, The Tulane University of Louisiana, at New Orleans. My sincere thanks go to Dr. Faust for his gracious assistance.—*A CM.*

> a short stick, placed upon the artery and struck. In case of cupping, they open the skin with a knife, put a little calabash over the opening, burning birchbast instead of a lamp."

The Lenni Lenape's method of therapeutical sweating will be discussed below (p. 128).

The only step taken by Zeisberger and his Moravian associates toward combatting the fevers was a wise preventive measure. Under date of January 2, 1776, Zeisberger writes in the Schönbrunn Diary (11):

> "Upon deliberation with the [Indian] helper Brethren, we resolved to lead water from the Muskingum [the Tuscarawas, *ACM*] into the little lake [the meander lagoon, *ACM*] near our spring, so that, in the summer time, we may not have stagnant water but a flowing stream beside our Town; which, as we hope, will not only be conducive to the health of the place but also bring various conveniences with it. We can do this without much trouble and labor if we dig a ditch about thirty rods in length. On the 4th [of January], the Brethren made a beginning, completing the task in a few days, as far as the water will now permit; the rest of the work must be left until warm weather comes."

If that had been done sooner, it might have prevented the hatching of millions of mosquitoes and, through it, many a case of malaria. As it was, the settlement could benefit from it for only fifteen months, since in April, 1777, under the duress of the Revolutionary War, Schönbrunn had to be abandoned, and was subsequently destroyed.

In regard to another serious endemic affliction of the Ohio Lenni Lenape, in the 1770's, namely, pulmonary tuberculosis, called *Schwindsucht* (consumption) in the mission diaries, the Schönbrunn Indian community appears to have fared very well. No more than two cases are on record in the Schönbrunn Diaries; both of them youths, who died at the Mission: the one (12), in 1773, had "been suffering from consumption for a year;" and the other (13) "was baptized," and "died December 10," 1775. "He came to us suffering from consumption," the diarist explains.

Heckewelder (14) offers the following aetiological comment:

> "Consumptions are very frequent among them since they have become fond of spiritous liquors, and their young men in great numbers fall victims to that complaint. A person who resides among them may easily observe the frightful decrease of their numbers from one period of ten years to another."

These lines were obviously written many years after Heckewelder's sojourn at Schönbrunn; yet, as early as 1772, he had made his basic observations; in that same year, the Rev. David McClure (15) had occasion to witness an alcoholic orgy at Gekelemukpechünk, the Lenni Lenape capital.

Heckewelder correctly established an aetiological connection between alcoholic excesses and pulmonary tuberculosis, in that habitual drunkenness had obviously lowered the natives' physical resistance to tubercular infection, especially that of their young men, who were the principal offenders. Most likely, the two young TB victims who died at Schönbrunn had come to the Mission in their extreme despondency, seeking physical help as well as protection from further alcoholic temptations; for they knew that in the Moravian settlements "spiritous liquors" were not tolerated. Motivated by former experiences at their Mission town of Langundo-Utenünk, and by more recent ones at the newly founded Missions of Schönbrunn and Gnadenhütten, Zeisberger, Heckewelder, and Ettwein decided to enforce relentlessly the Mission statute prohibiting both the importation and the use of intoxicating liquor within the precincts of a Moravian settlement. The mission diaries record no infraction of this rule. In fact, the Moravian example

caused the Grand Council in Gekelmukpechünk, early in 1773, to pass a similar law for the heathen capital, which, on March 6, was most drastically enforced, according to the following entry in the Schönbrunn Diary (16):

> "Two days ago, in Gekelemukpechünk, in pursuance of their resolutions, they had accomplished the first carrying into effect of their Acta, smashing ten barrels of rum for a trader and pouring out the contents on the ground, even before he came into their town."

Unfortunately, the good intentions of King Netawatwes' government were of a deplorably short duration. In Schönbrunn, however, the prohibition statute was all the more rigorously enforced. Under March 2, 1774, the Diary reads, as follows (17):

> "We spoke with Indians who had come from Pittsburg, bringing rum with which to trade with the Indians, telling them that if they had such wares they should take another route, not passing through here. The same notice will be given traders who come here or pass through."

When, on April 6, 1775, drunken Indians arrived at Schönbrunn, with horse-loads of rum, their liquor was poured out; the Diary carries this comment (18):

> "Thus we do with all Indians and white people, without respect of persons, who come into our Town or neighborhood with such wares. They may not use them as they please, so long as they are here; when they leave, they are accompanied to our borders."

Thus Schönbrunn was effectively protected against the plague of alcoholism, safeguarding, thereby, in great measure, its inhabitants' resistance to phthisic infection. Although, of course, the one or other case of pulmonary tuberculosis, in the community, may have remained undetected, yet the fact remains that the disease was definitely not endemic at Schönbrunn.

Another epidemic, however, although of an entirely different character, is mentioned in the Schönbrunn Diary, under date of July 17, 1773, as having attacked the children of the community. This entry, made in connection with the death of a four months old baby girl, reads, as follows:

> " . . . A bad cough which has infested this entire region and, since the spring of the year, had taken a toll of 50 children in Gekelemukpechünk [the Lenni Lenape capital town, *ACM*] alone, has also spread among our own children, and only a very few have been spared."

The Gnadenhütten Diary, on August 10, 1773, concludes the report of a two-year old girl's death with the remark that "a blue cough accelerated her departure" [*"ein blauer Husten beförderte ihren Heimgang"*], indicating that Gnadenhütten, halfway between Gekelemukpechünk and Schönbrunn, likewise suffered from the cough epidemic. It is possible that this epidemic cough, with its numerous casualties, was an especially vicious incidence of whooping-cough; especially vicious, perhaps, because it may have attacked these Indians for the first time in their history. Yet it is also possible that it may have been a symptom of some other epidemic children's disease which, for lack of other symptoms recorded, cannot be identified. It is quite certain that the contagion was carried, to both Gnadenhütten and Schönbrunn, by visitors from the nearby heathen town so frequently mentioned in the diaries. From the Schönbrunn burial statistics, it seems more than likely that, apart from the one assured "cough" fatality, some more, if not all, of the nine infant deaths in 1773 had been caused by that epidemic.

Apart from what he called "pulmonary consumptions," Heckewelder (19) lists, as the principal "disorders to which the Indians are most commonly subjected, . . . fluxes, fevers and severe rheumatisms;" with the comment, that they are "all proceeding probably from the kind of life they lead, the hardships they undergo, and the nature of the food they take." In the light of present day

dietetics, their daily menu, mainly consisting of corn, beans, nuts, squashes, pumpkins, fresh and dried meat, fowl, fish, eggs of hens and turtles, various fruit, and even milk, buttermilk, and butter, maple sugar, and (very little) salt, constitutes an almost ideally varied and balanced diet such as cannot possibly be held responsible for the disorders listed above. In fact, on his very next page, Heckewelder makes the following statement (20):

> "The gout, gravel, and scrofula or king's evil, are not known among the Indians. Nor have I ever known any one that had the disorder called *Rickets.*"

Only one of these, scrofula, has nothing to do with nutrition; gravel, or kidney stones, may have a nutritional cause; but gout and rickets are definitely nutritional diseases. Their total absence, in any region, is sure proof of a highly adequate diet.

Heckewelder's term, "fluxes," means diarrhoeas of various origin. In the light of modern medicine, they are symptoms of diseases rather than diseases in themselves; mostly, of infectious diseases such as dysentery, and others.

The same is true for Heckewelder's "bilious fever" (21), which, in older medicine, was regarded as a disease in itself: *Febris biliosa.* Today, it is listed as one of the symptoms of a number of diseases, such as typhus, gall-stones, and other disorders of the liver and the bile duct. Zeisberger (22), in the Schönbrunn Diary, describes the case of a man "who had died . . . some time after" recovering from some ailment; "he experienced a chill, which ended in a yellow fever that continued for eleven days;" then he died. The eleven-day fever period makes it appear somewhat doubtful whether this was malaria (which frequently is attended by jaundice); or not rather a case of some other infectious disease involving the gall duct and liver. We are equally in the dark about what Heckewelder calls the "*yellow vomit,* which at times, carries off many of them. They generally die of this disease on the second or third day after the first attack" (23). In speaking of "bilious fevers" in general, he states (24)

> "that these fevers generally make their first appearance in the season of the wild plum, a fruit that the Indians are particularly fond of. Sometimes also after a famine or long suffering for want of food, when they generally make too free an use of green maize, squashes and other watery vegetables."

Rather than cause these intestinal disturbances and the fevers attending them, the fruits and vegetables mentioned may have aggravated the patients' condition, especially when excessively used. It is well known today that most seasonal diseases are due to the prevalence, at the particular season, of their inciters. The principal cause of all these diarrhoeas and bilious disorders was doubtless the general sanitary situation in the Indian settlements. Zeisberger (25) has this to say:

> "The brass kettles in which they cook, the dishes which they make of the growths and knots of trees, and also their spoons, which are usually very large, are rarely washed. . . . Yet in this respect, also, one finds differences, for some are as cleanly as one could expect it. The Monsys and the Mingoes, however, far excell the Delawares in uncleanliness, and, since the dogs are in their houses or lying about the fires, there are universally many fleas and other insects."

As the Monsys, here mentioned, were a Lenni Lenape tribe living at the Big Beaver, the "Delawares," whom they excelled in uncleanliness, apparently were the Lenni Lenape in the Muskingum area. What Zeisberger says about the dogs in the houses is clearly meant to have universal validity. It is uncertain, however, whether the following statement of Zeisberger (26), likewise applies to the Ohio Lenni Lenape:

> "Sometimes they [the spoons] are only licked by the dogs in lieu of washing."

Although there is evidence (27) that the Missionaries and their wives tried to raise their converts' standards of cleanliness, it is uncertain to what extent such attempts were successful.

After calling the Indian bed, made up of "a mat with one or more deer or bear skins upon it, . . . a comfortable couch in summer time," Zeisberger (28) states that it "may be made very uncomfortable by the fleas brought in by dogs." At another place (29) he remarks that "bedbugs are to be found in the Indian huts at any time and fleas in the summer, not a few."

Such filthy conditions, favoring the spread of any kind of infection, were made considerably worse when a sick person was in the house, especially one with an infectious intestinal disease. Zeisberger (30) writes, as follows:

> "Care and attention for the sick amount to but little, the Indians being poor nurses. So long as they can go out [to relieve themselves, *ACM*] they lie on the hard bed of boards; no longer able to do this they are laid on the ground near the fire [which is in the center of the house, *ACM*], possibly upon grass or hay, a small hole in the ground under the patient serving as a bed-pan."

No further comment is needed.

The worst scourge in the life of the inhabitants of Schönbrunn, Indian as well as white, next to malaria, was what both Zeisberger and Heckewelder call by the collective name of rheumatism. Heckewelder (31) states that "their old men are very subject to rheumatisms in the back and knees," while Zeisberger (32) remarks that "with advancing years" they commonly contract rheumatism, "often leading to lameness, deafness or blindness." It is evident that the term denotes symptoms of various diseases; symptoms of an arthritic nature, coupled with other symptoms. All these rheumatisms were invariably treated mainly by "bathing and sweating" (33). Heckewelder attests a successful sweat cure administered in the Lenni Lenape fashion to himself, when suffering from rheumatism (34), in September, 1772, at Schönbrunn (35). More about this later.

In connection with the matter of rheumatism, Heckewelder (36) makes the following remark which is of some significance for medical history, particularly of the Tuscarawas area where most of his observations were quite evidently made. He writes:

> ". . . I have seen boys 10 and 12 years of age, who through colds or fits of sickness had become so contracted that they never afterwards recovered the use of their limbs."

What Heckewelder here describes is plainly Poliomyelitis; of especial significance is his aetiological, though erroneous comment: "through colds or fits of sickness;" for it has been observed that, frequently, a very early symptom of infantile paralysis is a 'running nose;' the "fits of sickness" evidently were such convulsions as are known to occur in the pre-paralytic stages of Poliomyelitis. It is likewise of importance that no epidemic incidence of the disease is described in the diaries of Schönbrunn or of any other Moravian Indian Mission in Ohio.

In an area in which both rattlesnakes and copperheads were frequent, occasionally people were bitten; yet deaths from snake bites were rare. Zeisberger (37) writes, as follows:

> "Indians who have been bitten, even if they happen to be quite alone in the forest, know what to do. They seek certain herbs and roots that may be found anywhere and cure themselves of the bite, so that one rarely hears of a death occasioned by the bite of this serpent [rattlesnake]."

Apparently, the medical aid available in the Schönbrunn Mission community was adequate. It is certain that there was no white physician at, or even near, Schönbrunn; nor was there need for any. Both Heckewelder and Zeisberger attest that the Indians not only had competent professional practitioners of both sexes

with a sound knowledge of their native *materia medica*, but that there were also a great many non-professional men and women in possession of medical recipes, the composition of which they jealously guarded as valuable secrets. Besides, there were also, in every heathen community, "medicine men," who combined natural treatment of ailments with magic hokus-pokus. Of course, they were not to be consulted by the Mission populace. On the other hand, it is most likely that, in cases of emergency, the one or the other serious practitioner was called in from the heathen neighborhood. In most cases, though, the medical knowledge available among the Mission Indians seems to have sufficed. After criticizing the common Indian habit of dosing their patients excessively, Heckewelder makes this statement about native physicians (38):

> "Nevertheless, I must say, that their practice in general succeeds pretty well. I have myself been benefited and cured by taking their emetics and their medicines in fevers, and by being sweated after their manner while labouring under a stubborn rheumatism. I have also known many, both whites and Indians, who have with the same success resorted to Indian physicians while labouring under diseases. The wives of the Missionaries, in every instance in which they had to apply to the female physicians, for the cure of complaints peculiar to their sex, experienced good results from their abilities. They are also well skilled in curing wounds and bruises. I once for two days and two nights, suffered the most excruciating pain from a felon or whitlow on one of my fingers, which deprived me entirely of sleep. I had recourse to an Indian woman, who in less than half an hour relieved me entirely by the simple application of a poultice made of the root of the common blue violet. . . . I firmly believe that there is no wound, unless it be absolutely mortal, or beyond the skill of our own good practitioners, which an Indian surgeon (I mean the best of them) will not succeed in healing."

The greatest asset of aboriginal, and particularly Lenni Lenape, therapy no doubt was the sweating-oven. Since Heckewelder was successfully "sweated after their manner" for rheumatism, in September, 1772 (39), the Mission Indians of Schönbrunn must have installed their local sweating-oven shortly upon the founding of their settlement; in fact, two of them, since the women had their own. These sweating-ovens were considered an indispensable necessity in every Indian settlement, from the Pacific to the Atlantic. Heckewelder (40) describes the Lenni Lenape sweating-oven, such as used by himself at Schönbrunn, as follows:

> "The sweat oven is the first thing that an Indian has recourse to when he feels the least indisposed; it is the place to which the wearied traveler, hunter, or warrior looks for relief from the fatigues he has endured, the cold he has caught, or the restoration of his lost appetite. This oven is made of different sizes, so as to accommodate from two to six persons at a time, or according to the number of men in the village, so that they may be all successively served. It is generally built on a bank or slope, one half of it within and the other above ground. It is well covered on the top with split plank and earth, and has a door in front, where the ground is level, to go or rather creep in. Here, on the outside, stones, generally of about the size of a large turnip, are heated by one or more men appointed each day for that purpose. While the oven is heating, decoctions from roots of plants are prepared either by the person himself who intends to sweat, or by one of the men of the village, who boils a large kettleful for the general use, so that when the public cryer going his rounds, calls out *Pimook!* "go to sweat!" every one brings his small kettle, which is filled for him with the potion, which at the same time serves him as a medicine, promotes a profuse perspiration, and quenches his thirst. As soon as a

sufficient number have come to the oven, a number of the hot stones are rolled into the middle of it, and the sweaters go in, seating themselves or rather squatting round those stones, and there they remain until the sweat ceases to flow; then they come out, throwing a blanket or two about them that they may not catch cold; in the meanwhile, fresh heated stones are thrown in for those who follow them. While they are in the oven, water is now and then poured on the hot stones to produce a steam, which they say increases the heat, and gives suppleness to their limbs and joints."

Then he continues with this phrase which clearly reflects a personal recollection of his sickness and its cure, in 1772:

"In rheumatic complaints, the steam is produced by a decoction of boiled roots, and the patient during the operation is well wrapped in blankets, to keep the cold air from him, and promote perspiration at the same time."

Heckewelder concludes his description with the following remarks:

"Those sweat ovens are generally at some distance from an Indian village, where wood and water are always at hand. The best order is preserved at those places. The women have their separate oven in a different direction from that of the men, and subjected to the same rules. The men generally sweat themselves once and sometimes twice a week; the women have no fixed day for this exercise, nor do they use it as often as the men."

The south slope of the Schönbrunn pleateau, with the lagoon near by, "where wood and water are always at hand," answers to perfection Heckewelder's description of the locality of the sweating-oven for both men and women.

The Rev. David McClure who, in 1772, visited the Lenni Lenape capital of Gekelemukpechünk, where he saw a sweating-oven in operation, adds the significant information (41) that "to pulmonary disorders it is fatal, as also in the small pox."

Not a single case of this latter disease is recorded in the Schönbrunn Diaries or, so far as I know, in any of the diaries from the other Moravian missions in Ohio. That is quite astounding, in view of the past ravages of the disease in the East, on which McClure makes this comment: "This latter scourge of the human race has swept off multitudes of Indians from this continent."

With the Schönbrunn Lenni Lenape it may have been a matter of acquired immunity. A great many of them had come to Schönbrunn with the Moravians from Missions in Pennsylvania, some even from as far east as Bethlehem, and it is almost certain that they all had, once in the past, overcome the smallpox. Most likely, for the same reason, the white traders from the East, who regularly visited both the Missions and the heathen settlements in Ohio, were likewise immune; otherwise, fresh infections with smallpox would inevitably have occurred, at least among the children and younger people.

Zeisberger, Heckewelder, and McClure, in various instances, mention the sexual promiscuity and the alarming spread of Venereal Diseases among the Lenni Lenape. The Schönbrunn mission statutes successfully kept these moral and physical disorders out of the settlement by outlawing all offenders of either sex; and by insisting on the sacredness of the marriage bonds, which, in the heathen neighborhood, had long been scandalously ignored. The Schönbrunn Diaries fail to indicate to what extent previously infected converts, otherwise in good standing, contaminated their spouses and offspring. Yet it is reasonable to assume that numerous ailments of both adults and children, especially infants, could have been traced, in the light of modern diagnosis, to venereal infections.

The List of Burials in the Schönbrunn Cemetery, from 1772 to 1777 (42), provides the mortality figures for this period. In 1772, out of a total of 92 inhabitants, only one person, an infant girl, was buried. Fifteen people, including nine infants, out of a total of 184 souls, died in 1773. That is the only year for which the Mission Diary shows a direct correlation between the death rate and local health: 1773, as previously stated, was a bad malaria year, and also the year of the cough epidemic mentioned above (p. 125). In 1774, four persons, including two infants, were buried, of a population of 220. The mortality figure of 1775 is seven persons, among them three infants; the total population was 263. Out of an estimated total of over 300 people, in 1776, twelve were buried, including "five children," whose age is not given. In 1777, only one funeral is listed, in January; from then on, until April 19, when the Mission was abandoned, nobody seems to have died.

It is to be noted that the population of Schönbrunn increased, as substantially and steadily as it did, by immigration rather than by births. Moreover, the babies born were not so consistently recorded in the Mission Diaries as were those who had died. Yet it is evident that the mortality of infants was high: over one-half of all deaths, each year, were infants.

Referring, not to infants in particular, but to children in general, Heckewelder (43) states that "worms are a very common disorder among" them, and that

> "great numbers of them died from that cause. They eat a great deal of green corn when in the milk, with beans, squashes, melons, and the like; their bellies become remarkably large, and it is probably in that manner that the worms are generated."

Here again we have Heckewelder's frequent reversal of cause and effect; medical science knows that a distended and protruding abdomen, in a child, frequently indicates Hookworm infection (Ancylostomiasis), or the presence of Ascarides (Ascariasis), in which cases the vegetables and fruits, mentioned above, most likely made bad matters worse. Although Heckewelder's observations were made with no particular reference to Schönbrunn, yet they may be safely applied not only to Schönbrunn but also to the other Moravian mission settlements, as well as to the pagan communities of the area. The same is true for Trichinosis. Heckewelder (44) tells a story which makes it evident that the pigs were left at liberty to roam in the forest. When an infected pig was eaten by a bear, or died and was eaten by another pig, the people who ate of that bear's or other pig's flesh were most likely to contract Trichinosis. The general Indian habit, however, of cooking their meats and fish "so thoroughly . . . that they fall apart," as stated by Zeisberger (45), may have substantially curbed the incidence of Trichinosis, although it probably did not prevent it entirely.

All available evidence points to it that the health conditions, in the Moravian Mission town of Schönbrunn, during the five years of its existence, were as good as could be expected in the close proximity to a malaria swamp; and in the almost total absence of such sanitary measures as are today considered the minimum requirement for healthy living, even in a primitive environment. Had not Schönbrunn enjoyed the ample and excellent drinking water from the Beautiful Spring that lent it its name, the health conditions of the place probably would have been even much worse. True, the preventive measures taken, in many respects, by the Mission authorities, helped to establish certain rudiments of hygiene and principles of moral conduct, that no doubt made their converts better men and women than were their pagan neighbors. Yet it is equally apparent that, without the recourse which the Missionaries and their families were incessantly forced to take to the aboriginal resources of the wilderness, and to the age-old experience and medical lore of their native charges, they would have been hopelessly lost.

REFERENCES

With abbreviations used in the Notes

GnD—Mission Diary, Gnadenhütten (Ohio).—Mission reports periodically sent to the Moravian mother church, at Bethlehem, Pa.; 1772–1777; ms. MAB.

HH—Heckewelder, John, *History, Manners, and Customs of the Indian Nations, etc.* (*Memoirs of the Historical Society of Pennsylvania*, Vol. XII), Philadelphia, 1881.

MAB—Archives of the Moravian Church, at Bethlehem, Pa.

McCD—Dexter, Franklin B. (ed.), *Diary of David McClure, Doctor of Divinity, 1748–1820*, New York, 1899.

MMNO—Masters, Charles O., "A Study of the Adult Mosquito Population of a Northern Ohio Woods" (*Ohio Jour. Sci.*, 49: 12, 1949).

SD (1–12)—Mission Diary, Schönbrunn (Ohio), Nos. 1–12.—Mission reports periodically sent to the Moravian mother church, at Bethlehem, Pa.; 1772–1777; ms. MAB.

ZH—Hulbert, Archer B., and Schwarze, William N. (ed.), *David Zeisberger's History of the Northern American Indians* (Columbus, Ohio: Ohio State Archaeological and Historical Society, 1910); reprinted from *The Ohio State Archaeological and Historical Quarterly*, Vol. XIX, Nos. 1 and 2 (January and April), 1910.

NOTES

(1) *SD 1*, June 28, '72
(2) *HH*, p. 220
(3) *ZH*, p. 75
(4) *SD 2*, Sep. 28, '72
(5) *GnD*, Aug. 18, '73
(6) *GnD*, Sep. 21, '73
(7) *SD 12*, Sep. 30, '75
(8) *SD 12*, Oct. 22, '75
(8a) *MMNO*, p. 13 f.
(9) *HH*, p. 224 f.
(10) *ZH*, p. 27
(11) *SD 12*, Jan. 2, '76
(12) *SD 5*, July 2, '73
(13) *SD 12*, Dec. 7, '75
(14) *HH*, p. 223
(15) *McCD*, pp. 71–78
(16) *SD 3*, Mar. 8, '73
(17) *SD 7*, Mar. 2, '74
(18) *SD 10*, Apr. 6, '75
(19) *HH*, p. 222
(20) *HH*, p. 223
(21) *HH*, p. 222
(22) *SD 5*, Sep. 5, '73
(23) *HH*, p. 222
24) *ibid.*
(25) *ZH*, p. 16
(26) *ZH*, p. 86
(27) *GnD*, June 29, '73; *SD 10*, Apr. 27, '75; *SD 12*, Jan. 15, '76
(28) *ZH*, p. 86
(29) *ZH*, p. 75
(30) *ZH*, p. 24
(31) *HH*, p. 222
(32) *ZH*, p. 24
(33) *ZH*, p. 55
(34) *HH*, p. 229
(35) *SD 2*, Sep. 28, '72
(36) *HH*, p. 222
(37) *ZH*, p. 222
(38) *HH*, p. 229
(39) *SD 2*, Sept. 11, '72
(40) *HH*, p. 225
(41) *McCD*, p. 67
(42) ms. MAB
(43) *HH*, p. 222
(44) *HH*, p. 147
(45) *ZH*, p. 14

DID YOU KNOW?

The Ohio Journal of Science enjoys a world-wide distribution. It is mailed regularly to more than 400 college and university libraries located in the United States of America and 79 foreign countries. Among these are 22 libraries in the Union of Soviet Socialist Republics (Russia).

Authors who have published in the Ohio Journal of Science tell us they receive more requests for reprints from articles published in the Journal than from those published in periodicals pertaining to their own special field of science.